



LON Assessment for STS-127

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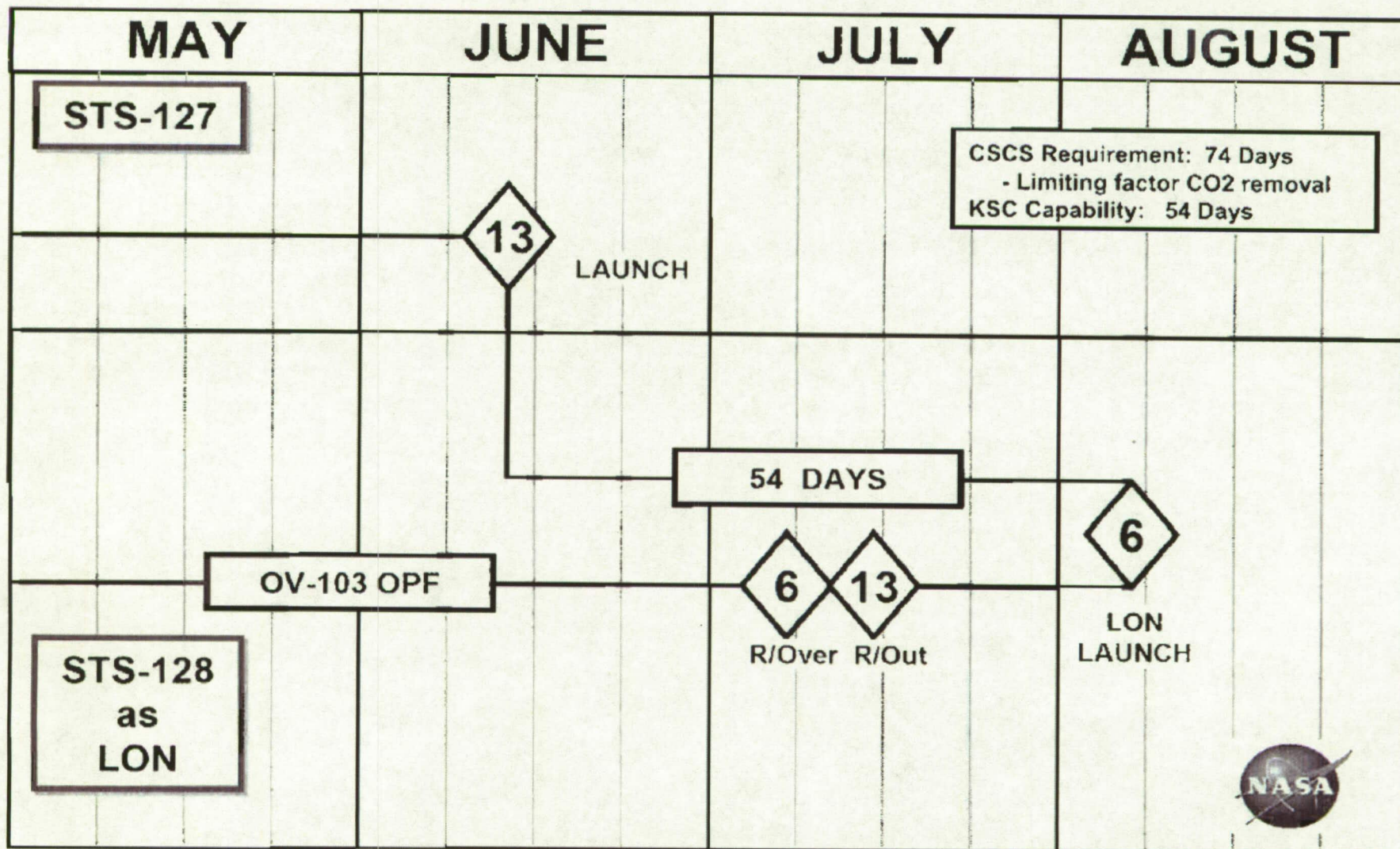
D. Rainer

Date:

06/01/09

Page:

1





KSC SAFETY AND MISSION ASSURANCE DIVISION

NASA Kennedy Space Center, Kennedy Space Center, Florida

Presenter:

C. Knear/SA-B4

Date:

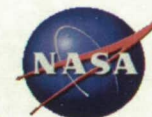
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Page:

0

Safety and Mission Success Review

STS-127





KSC SAFETY AND MISSION ASSURANCE DIVISION

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STS-127 SMSR Shuttle Processing CoFR Matrix

Presenter:
C. Knear/SA-B4

Date:
06/01/09

Page:
1

Flight Preparation Element	Summary Description	Non-standard Open Work/Exception/Constraint	ECD	Stoplight Status (G-Y-R)
Hazard Analysis and Reports	Hazard analysis and reports have been verified to have valid hazard causes, controls, and verification.	None	N/A	G
Critical Items List (CIL)	Critical item lists (CIL's) have been verified to have valid criticality, effects & operational controls.	None	N/A	G
HW S/W Design Certification	Certification of hardware requirements have been verified and documented.	None	N/A	G
Risk, Probabilistic Reliability, Maintainability and Supportability Analysis	Any flight specific risk, probability, reliability, maintainability, and supportability analysis findings impacting safety or mission success have been resolved.	None	N/A	G

G - Standard open work or completed

Y - Non-standard open work or exception

R - Constraint for flight





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STS-127 SMSR

Shuttle Processing CoFR Matrix (Cont'd)

Presenter:

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Date:

06/01/09

Page:

2

Flight Preparation Element	Summary Description	Non-standard Open Work/Exception/Constraint	ECD	Stoplight Status (G-Y-R)
Audits / Surveillance Findings	Any flight specific audit or surveillance findings impacting safety and mission success have been resolved.	None	N/A	G
Interface Control Documents (ICD's)	ICD's have been verified to not invalidate certification, hazard controls, or CIL rationale.	None	N/A	G
NSTS 08171 Operations and Maintenance Requirements and Specifications Document (OMRSD)	RCNs to OMRSD have been verified to not invalidate hazard and CIL controls.	None	N/A	G

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STS-127 SMSR Shuttle Processing CoFR Matrix (Cont'd)

Presenter:

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Date:

06/01/09

Page:

3

Flight Preparation Element	Summary Description	Non-standard Open Work/Exception/Constraint	ECD	Stoplight Status (G-Y-R)
Launch Commit Criteria (LCC)	LCC changes have been verified not to invalidate hazard controls or CIL retention rationale.	None	N/A	G
Problem Reporting and Corrective Action (PRACA) Reportable Items (HW & S/W)	HW & S/W program problem reporting and corrective action reportable items applicable to this mission have been disposition.	None	N/A	G
Waivers and Deviations (Level II/Level III)	Waivers, exceptions and deviations, have been verified to be acceptable for flight and any violation of any existing certification, hazard, and CIL rationale is documented.	None	N/A	G
Material Review Boards (MRB's)	MRB items requiring NASA S&MA disposition have been approved.	None	N/A	G
Alerts	Alert notices have been assessed for applicability to this mission and have been disposition.	(4) Open GIDEP Alerts: Recommendation: Not a Constraint	N/A	G

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STS-127 SMSR Shuttle Processing CoFR Matrix (Cont'd)

Presenter:

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Date:

06/01/09

Page:

4

Flight Preparation Element	Summary Description	Non-standard Open Work/Exception/Constraint	ECD	Stoplight Status (G-Y-R)
Mission Support	S&MA personnel supporting L&L, flight support, Mishap Investigation Team, and Mishap Rapid Response Team have been identified, trained, and qualified to support	None	N/A	G
Integrated Vehicle Readiness	Verify Integrated Vehicle Readiness has been assessed through performance of GMIPS, and surveillance and any discrepancies identified have been satisfactorily dispositioned	None	N/A	G
Critical Process Changes	Verify critical process changes have been assessed and are no safety impact to ground processing or mission success	None	N/A	G
Contingency Planning	Verify Contingency Plans are current and in place for Launch and Landing	None	N/A	G

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KSC SAFETY AND MISSION ASSURANCE STS-127 SARR

Presenter:

C. Knear/SA-B4

Date:

06/01/09

Page:

5

Certificate of Flight Readiness (CoFR) Items Reviewed:

1. Hazard Analysis for Ground Systems
2. FMEA/CIL
3. Hardware/Software Design Certification
4. Other Risk Analysis (GORA, PFMEA)
5. Audits
6. Interface Control Documents
7. OMRSDs for Ground Systems
8. Launch Commit Criteria
9. Integrated Vehicle Readiness
10. PRACA
11. Waivers, Variances, Deviations, Exceptions
12. Material Review Board
13. Alert Notification
14. Mission Support Training
15. Critical Process Changes
16. Contingency Planning

Shuttle Items S&MA Reviewed:

Flow Control Valve
TPS Contamination

ISS/Payload Items Reviewed:

Integrated Cargo Hazard Analysis
Ground Safety Reviews
Quality Assurance Surveillance
Independent Mission Assessment
Residual Risks

Institutional S&MA Items Reviewed:

Construction/Safety Activities at Launch
Critical Facilities
Engineering Assurance
Quality Assurance

S&MA Integration Office Items Reviewed:

Range Safety

KSC S&MA performed an internal review on 05/06/2009 and identified no constraints against this milestone and will continue to track the satisfactory completion of open work





KSC SAFETY AND MISSION ASSURANCE
STS-127
SARR Readiness Statement

Presenter:
C. Knear/SA-B4

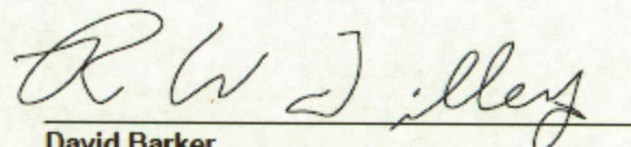
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Page:
6

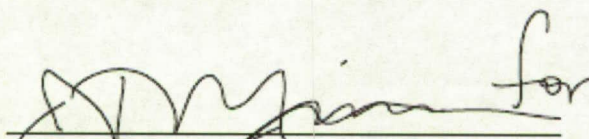
Readiness Statement – “KSC Safety and Mission Assurance is ready to support the STS-127 Launch and Landing.”

 5.6.09

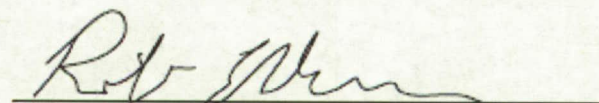
Mark Wiese
Chief, KSC S&MA Launch Vehicle
Processing Division



David Barker
Chief, KSC Institutional S&MA Division

 for

Maynette Smith
Chief, KSC S&MA ISS & Spacecraft
Processing Division

 for

Michael D. Campbell
Chief, KSC S&MA Integration Office



II.C.XX Side Flame Deflector Shear Pin

SSE: Ravi N. Margasahayam

SUBJECT: Missing Side Flame Deflector Shear Pin

L I K E L I H O O D	Probable			
	Infrequent			
	Remote			X
	Improbable			
		Marginal	Critical	Catastrophic
S E V E R I T Y				

Summary: As the final preparations for STS-125 launch were underway, USA structures personnel supporting ground operations could not account for 2 (two) out of 16 (sixteen) shear pins that are used to support Side Flame Deflectors jacking operations on pad 39A. Since the shear pins were not found in the shop, it was assumed that they could either be on the pad surface or could have been removed and placed elsewhere. A red crew was sent to the pad and the 2 (two) pins were found on the west Side Flame Deflector. The pins were removed from the pad prior to launch.

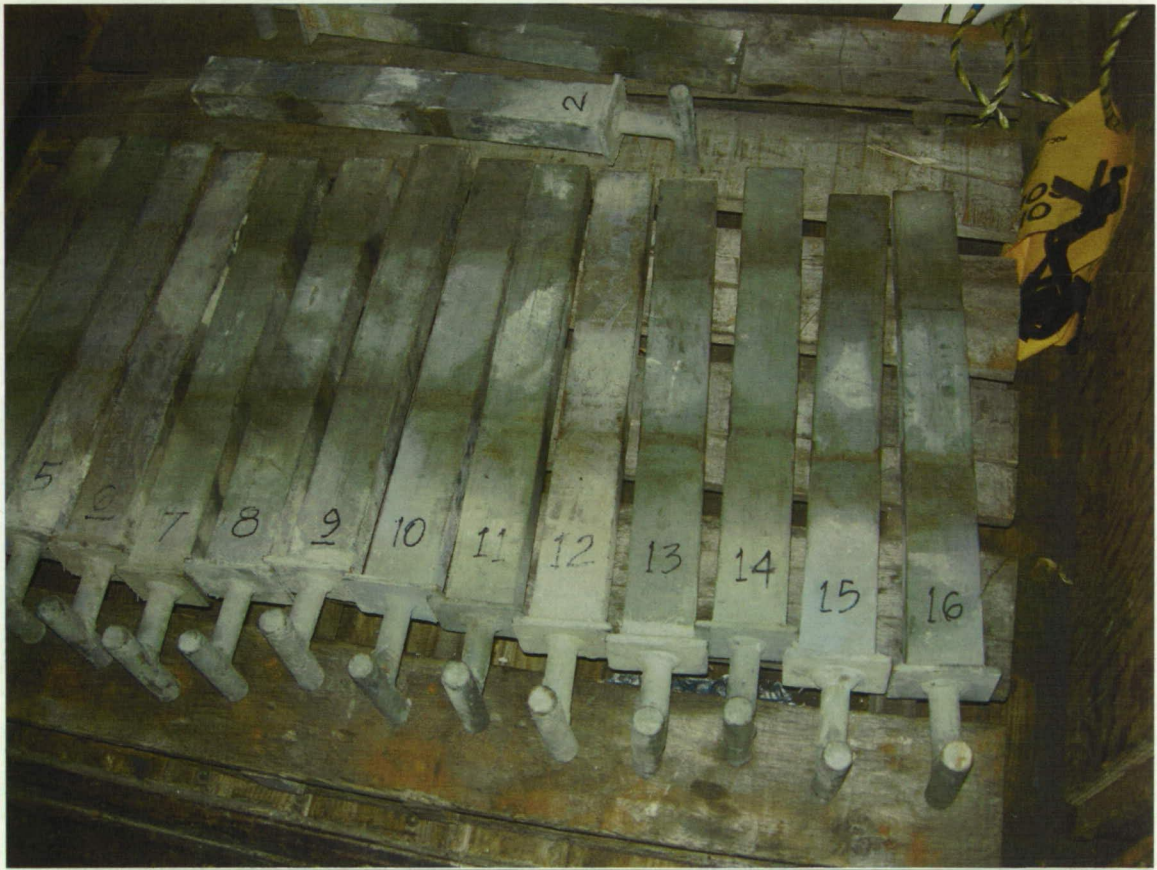
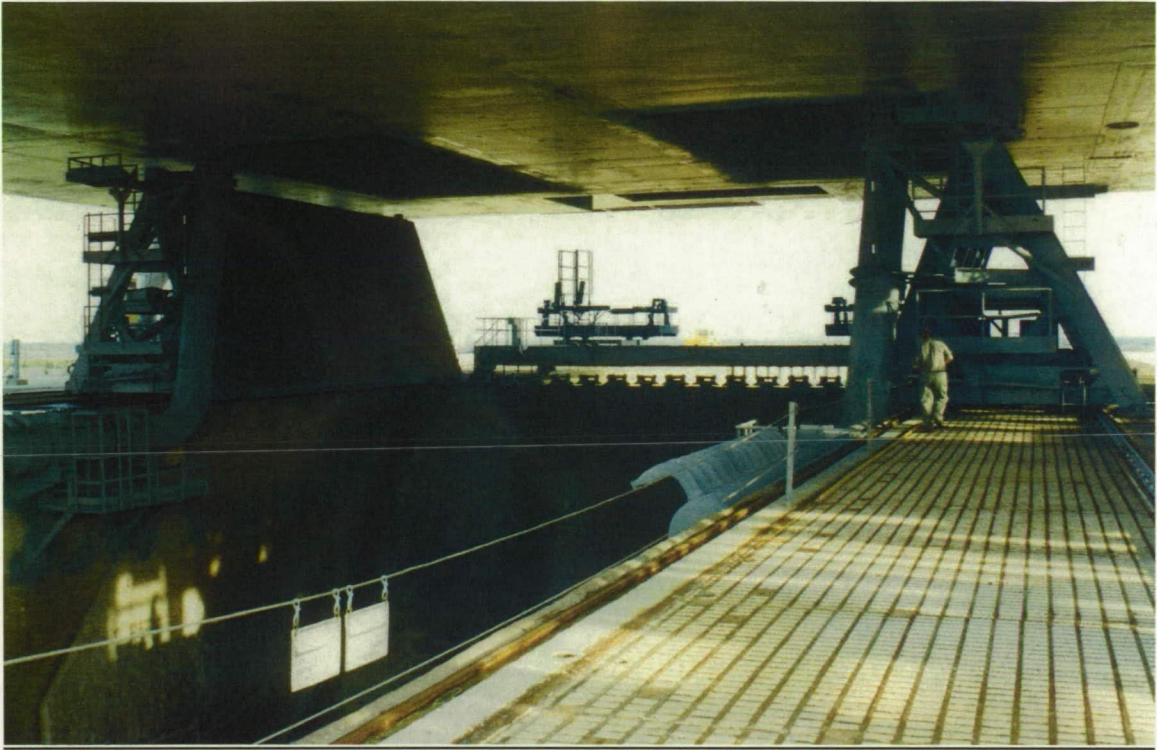
Functionality: The Side Flame Deflector is moved into launch configuration underneath the MLP, partially covering the SSME exhaust well (5%) and SRB exhaust well (100%), in the east-west direction. The purpose of the Side Flame Deflector is to facilitate flow of the rocket exhaust into the flame trench, rather than the east/west pad surfaces.

Historical: During the early part of the Shuttle program (first 10-15 launches); these shear pins were left in place, since they were behind the Side Flame Deflector and away from the plume impact zone. This shielding meant that the plume pressures would not be a concern. There were no failures or FOD concerns during the first 15 launches due to shear pins. After the first 15 or so launches, it was decided that the shear pins would be removed for launch and stored in the structures shop prior to launch to eliminate FOD concerns.

Impact/Effects: During T+0 and up to T+1 seconds, there is a tremendous amount of ignition overpressure (IOP) loads generated by the rocket exhausts causing a severe vibratory environment, that could result in loose items (including shear pins) becoming FOD which could ricochet against the FSS west surface. While the possibility of this FOD reaching the orbiter is remote, one cannot categorically rule out the possibility that damage to the pad ground systems could be avoided.

Resolution/Flight Rationale:

- USA ground structures will remove all shear pins and store them in the shop for STS-400. A dev will be put in the book and step added in OMI M3184 to verify that the pins have been removed.
- USA ground structures will secure/tether all shear pins in place (when not being used) for STS-127 and all future launches. OMI M3184 step will verify that this securing/tethering operation prior to launch.
- Once secured and tethered in place, there is remote possibility of the shear pins being dislodged during Shuttle liftoff due to the fact that they are completely shielded from the IOP waves and vibratory loads thereof.
- **Recommendation:** No constraint to STS-127





KSC SAFETY AND MISSION ASSURANCE DIRECTORATE

Launch Vehicle Processing Division

NASA Kennedy Space Center, Florida



II.C.XX Pad 39A SRB Flame Deflector Damage

Presenter D. Folkes

Date 06/01/09

Page 1

RISK TYPE: Safety
HAZARD REPORTS: N/A
CRITICALITY: N/A
ORGANIZATION: KSC S&MA
ASSIGNED TO: Doug Folkes / KSC / SA-B1

SAFETY RISK MATRIX				
L I K E L I H O O D	Probable			
	Infrequent			
	Remote			
	Improbable			
		Marg	Crit	Cat
SEVERITY				

RISK DESCRIPTION / STATEMENT:

- The liberation of SRB Flame Deflector refractory material at T-0 causes damage to KSC ground facility.

BACKGROUND

- During Launch of STS-125 from Pad A, approximately 25 to 50 square feet of Fondu Fyre from the SRB Main Flame Deflector liberated. The liberated Fondu Fyre impacted and damaged 5 facility pneumatic lines after contacting the bottom of the MLP. Follow on investigation determined this is an isolated event within our experience base for Fondu Fyre liberation and debris transport. Corrective action was to inspect/evaluate and repair the SRB Main Flame Deflector along with replacement of the 5 damaged facility pneumatic lines (4 welded, 1 threaded).

RATIONALE / RECOMMENDATION

- There has been previous loss of material. The configuration of the pad, water flow and exhaust direction and location of the MLP between the Flame Trench protects the flight hardware from debris exposure.
- Liberation of SRB Main Flame Deflector material is analyzed to produce a worst case consequence of damage to the KSC ground facility.
- Implementation of repairs reduce the likelihood of damage from possible (Infrequent) to (Remote) with a Severity of (Marginal).
- A repeat occurrence of the post STS-125 Pad A Main Flame Deflector Damage is Unlikely.***